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| 10/665,206 | 09/22/2003 | Tetsuya Kurosawa | 04173.0438 | 5743 |
| 22852 | 7590 | 08/02/2007 | EXAMINER | |
| FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER LLP 901 NEW YORK AVENUE, NW WASHINGTON, DC 20001-4413 | | | OSELE, MARK A | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/665,206 | KUROSAWA, TETSUYA | |
| | Examiner | Art Unit | |
| | Mark A. Osele | 1734 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 30 April 2007.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-4 and 6-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-4 and 6-18 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
 Paper No(s)/Mail Date 07052007.
- 4) Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4, and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al. '021 in view of He et al., Nam et al., Rogowski, and either Jeong et al. or Kretz et al. Abe et al. '021 shows a method and apparatus for stacking a plurality of semiconductor elements on a substrate comprising: sectioning semiconductor elements from semiconductor wafers, 1b, 1a, to provide at least first and second semiconductor elements, 3b, 3a, while keeping the sectioned first and second semiconductor elements in a state held by a holding member; picking up the first and second semiconductor elements with an absorption collet, 5a, 5b, in order of their sectioning; sticking the sectioned element adhesive, 7b, 7a, film to each of the back surfaces of the first and second semiconductor elements held by the absorption collet in order of their sectioning; sending the first and second semiconductor elements to the sectioned element adhesive film above a semiconductor device forming base material, 12, in order of their sectioning; adhering the first semiconductor element to the semiconductor device by the element adhesive film; and adhering the second semiconductor element on the first semiconductor element by the element adhesive film (Fig. 3; column 1, line

21 to column 2, line 5). Abe '021 fails to show cutting an element adhesive film to form a sectioned element adhesive film.

He et al. shows that an adhesive film for adhering a semiconductor element to a base material can be cut from a sheet of adhesive film, picked up by a vacuum collet, and placed into position for creating the bond (column 3, lines 27-43). It would have been obvious to one of ordinary skill in the art at the time the invention was made to cut the adhesive film of Abe et al. and place it on the semiconductor elements by the vacuum collet of He et al. because He et al. teaches that this adhesive application process can be completed using standard equipment used to handle semiconductor wafers (column 3, lines 21-29). The references as combined fail to show the cutting completed while attached to an adsorption member.

Nam teaches the film cutting section for an adhesive film used to bond semiconductor elements to a base material has an adsorption member, 50, for holding the adhesive film and a cutting mechanism, 48, for cutting the element adhesive film held by the adsorption member (paragraph 0028). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the adhesive film cutting adsorption member and cutting device of Nam et al. in the apparatus of the references as combined because Nam shows this to be a functionally equivalent alternate expedient to the film cutting section of He et al. Although Nam shows the adhesive film cutting adsorption member, 50, to be separate from the sticking adsorption collet, 52, it would have been obvious to one of ordinary skill in the art at the

time the invention was made to simplify the apparatus by using only a single adsorption member to act as both the adhesive film cutting member and sticking collet.

Rogowski teaches that porous metal plates over vacuum sinks allow for positioning of light weight sheets without deforming the sample into the pore sinks (column 4, lines 51-59). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a porous metal adsorption member in the apparatus of the references as combined because Rogowski teaches that these are advantageous in preventing deformation when positioning thin sheets and the adhesive film of Nam et al. is a thin sheet.

Although the references as combined show the first and second elements to be from two different semiconductor wafers, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the same wafer for two elements when it is desired that the elements be the same. The references as combined fail to show the claimed element thickness.

Jeong et al. and Kretz et al. each teach that semiconductor wafers with elements on their front surface are commonly thinned to a thickness between 20μ and 60μ (Jeong et al., column 6, lines 34-35; Kretz et al., column 1, lines 45-48). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the method of the references as combined for elements with thicknesses in the claimed range because both Jeong et al. and Kretz et al. each show this thickness for semiconductor wafers with elements thereon.

Regarding claim 4, He et al. shows mechanical cutting of the adhesive film. Furthermore, it is conventionally to supply adhesive films on rolls.

Regarding claim 8, stamping is a functionally equivalent alternate expedient to sawing.

3. Claims 2-3, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al. '021 in view of He et al., Nam et al., Rogowski and either Jeong et al. or Kretz et al. as applied to claims 1 and 6 above and further in view of of Sasaki et al. Sasaki et al. teaches that it is conventional to adhere a first holding member to the front of a semiconductor wafer, backgrind the rear of the wafer, apply a second holding member to the rear of the wafer, dice the wafer from the front of the wafer, and use push up pins to separate the semiconductor element from the second holding member (column 1, line 26 to column 2, line 7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the conventional steps of Sasaki et al. into the method of the references as combined in order to create the diced wafer because these steps are shown to be the conventional approach to creating individual elements on a holding member.

4. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al. '021 in view of He et al., Nam et al., Rogowski and either Jeong et al. or Kretz et al. as applied to claim 6 above and further in view of either Wojewnik et al. or Varaprasad et al. As shown in paragraph 2 above, the references as combined show

all of the instantly claimed limitations except for the cutting means to be a laser. Wojewnik et al. and Varaprasad et al. each teach that laser cutters and cutting blades are interchangeable when cutting a film to a desired shape for bonding to a substrate (Wojewnik et al., column 4, lines 43-48; Varaprasad et al., column 32, lines 27-39). It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the cutting blade of the references as combined with a laser cutter because Wojewnik et al. and Varaprasad et al. each show them to be interchangeable for the purpose of cutting a bondable film to the shape of a substrate.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al. '021 in view of He et al., Nam et al., Rogowski and either Jeong et al. or Kretz et al. as applied to claim 6 above and further in view of either Bura et al. As shown in paragraph 2 above, the references as combined show all of the instantly claimed limitations except for the protective film. Bura et al. teaches the use of a protective foil on the adhesive film adhered to the semiconductor element which is peeled off prior to bonding the semiconductor element to the base material (column 2, lines 46-53). It would have been obvious to one of ordinary skill in the art at the time the invention was made to add a film separation section for separating a protective film from the adhesive segments of the apparatus of the references as combined because Bura et al. teaches that protective films on such adhesive segments keeps the adhesive from picking up undesired particulates prior to bonding.

6. Claims 15-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al. '021 in view of He et al., Nam et al., Rogowski and either Jeong et al. or Kretz et al. as applied to claims 1 and 6 above and further in view of either Cobbley et al. As shown in paragraph 2 above, the references as combined show all of the instantly claimed limitations except for protruding semiconductor elements. Cobbley et al. also shows a method and apparatus for adhesively bonding a stack of elements to a base material wherein the semiconductor elements can be stacked with the second element protruding from the outside shape of the first element because this may be advantageous in various applications (paragraphs 0034 and 0035; Figs. 5B, 5C, 5D). It would have been obvious to one of ordinary skill in the art at the time the invention was made to stack the semiconductor elements of the references as combined in the orientation of Cobbley et al. because Cobbley et al. teaches the need applicability and effectiveness of this arrangement.

7. Claims 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al. '021 in view of He et al., Nam et al., Rogowski and either Jeong et al. or Kretz et al. as applied to claims 1 and 6 above and further in view of Oki et al. As shown in paragraph 2 above, the references as combined show all of the instantly claimed limitations except for the vacuum collets to hold the entire surfaces. Oki et al. shows a semiconductor element lifting apparatus wherein a semiconductor element, 10a, is lifted by a vacuum collet, 22, with the same dimensions (Fig. 2c; column 11, lines 8-13). It would have been obvious to one of ordinary skill in the art at the time the invention was

made to make the absorption collet and porous absorption member of the references as combined the same dimension as the work pieces being lifted because Oki et al. shows equal dimensions to support the entire work piece.

Response to Arguments

8. Applicant's arguments filed April 30, 2007 have been fully considered but they are not persuasive. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Although the reference to Rogowski fails to teach placing and cutting an adhesive film on a porous metal plate, the references as combined do teach this method. It is noted that Nam shows cutting an adhesive film which is adhered to a suction member and Rogowski teaches the desirability of porous metal plates used as suction members for holding thin sheets.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark A. Osele whose telephone number is 571-272-1235. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Philip Tucker can be reached on 571-272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



**MARK A. OSELE
PRIMARY EXAMINER**

July 17, 2007